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2083*

OPERATIONAL CHARACTERISTICS

FOR A

SPECIAL PURPOSE DF SET

50X1

Approved by :

Chairman, Research, Development,
and Production Review Board

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1. GENERAL INFORMATION

1.1. OBJECTIVE

The objective of this development program is to fulfill a requirement for a portable, compact, concealable Radio Direction Finder.

1.2. PROPOSED SERVICE EMPLOYMENT

This equipment shall normally be concealed upon the operator's person and will be operated under these conditions. Short-range detection and location of the source of radio signals shall be possible.

1.2.1. Walk-In

This equipment shall be suitable for walk-in operations.

1.2.2. Drop-In

This equipment shall be adaptable for drop-in operations.

1.2.3. Stay-Behind

This equipment shall be adaptable to stay-behind operations.

1.3. FUNCTIONAL REQUIREMENTS

This equipment shall be used for close-range, covert, detection and location of radio transmitter activity.

1.4. BACKGROUND

Portable, clandestinely-operated, DF equipment of this type does not presently exist.

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2. OPERATIONAL CHARACTERISTICS

2.1. FREQUENCY COVERAGE

The tuning range of this equipment shall be from 2 mc. to 16 mc.

2.2. EMISSION DESIGNATION

The equipment will be suitable for the detection of AM, CW, and MCW emission.

2.3. RANGE AND SENSITIVITY

Ordinarily, the range of this equipment will be approximately one mile. However, this range figure could be increased many times, depending on the power of the transmitter being monitored. The space sensitivity will be between 50 and 100 microvolts per meter.

2.4. OPERATION

The normal operating position of the subject equipment will be on a belt strapped around the waist of the operator and will allow operation of the controls in this position.

2.5. CALIBRATION ACCURACY

The calibration accuracy shall be maintained within 1/2 of 1 per cent.

2.6. INTERFERENCE ELIMINATION

Image rejection shall be 20 db. or better. IF rejection shall be 30 db. or better. Spurious responses shall be down 35 db or better.

2.7. STABILITY

Instability due to any cause after warm-up shall not exceed 300 cycles per second.

2.8. RESOLUTION AND DISCRIMINATION

The band width shall not be greater than 3 kc at 10 db. down or 5 kc at 30 db. down.

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2.9. FIDELITY

The fidelity shall be sufficient for intelligible voice reception.

2.10. SPECIAL FEATURES

If possible, a bandswitch shall be provided for complete frequency coverage in three bands. Otherwise, separate plug-in coils shall be used.

3. PHYSICAL CHARACTERISTICS

3.1. WEIGHT

Weight shall be no more than 2.5 pounds exclusive of batteries.

3.2. SIZE

The size shall not exceed 60 cubic inches.

3.3. ANTICIPATED POWER SUPPLY REQUIREMENTS

If feasible, mercury cells shall be used; otherwise, standard dry cells shall be used.

3.4. REQUIREMENTS FOR OPERATION, TRANSPORTATION, PACKAGING, AND STORAGE CONDITIONS

3.4.1. Climatic Requirements

3.4.1.1. Temperature Extremes

3.4.1.1.1. Storage

The equipment shall be capable of being stored at temperatures of minus 25 to plus 60 degrees Centigrade.

3.4.1.1.2. Operation

The equipment shall operate at temperatures that will exist under the operator's clothing at ambient temperatures of minus 25 to plus 50 degrees Centigrade.

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3.4.1.2. Humidity Extremes

The equipment shall be capable of operating under conditions of 100 per cent relative humidity.

3.4.1.3. Atmospheric Pressures and Precipitation

The equipment shall be capable of operating at altitudes up to and including 10,000 feet. The equipment shall also be capable of operation with only the protection afforded by the operator's clothing.

3.4.1.4. Dust and Spray

The equipment shall be capable of operation with the protection normally afforded by the operator's clothing. Severity of the dust or spray condition is limited by the ability of the operator to withstand such conditions.

3.4.1.5. Immersion

The equipment shall not be immersion-proof.

3.4.2. Tropicalization

Protection against fungus growth shall be provided.

3.4.3. Vibration and Shock

The equipment shall be sufficiently rugged to withstand the vibration and shock that will be experienced by the equipment when strapped to the leg of a running person.

3.4.4. Packaging and Packing for Domestic and Overseas Shipment

3.4.4.1. Domestic

Packaging for domestic shipment shall be of the type in general commercial use for the subject equipment. It shall provide maximum protection from normal hazards of handling and transportation and shall be of the type to insure acceptance at and safe delivery to the designated point by common or other carriers at the lowest applicable rate.

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3.4.4.2. Overseas

For overseas shipment these units shall be well-cushioned, sealed in vapor-proof barrier bags, and packed in water-resistant cartons before crating.

3.4.5. Packaging and Packing for Special Operations

This shall be done by the consumer.

3.5. SPECIAL FEATURES

There are several special features which characterize this equipment:

3.5.1. The unit must be shaped to "fit" the body.

3.5.2. The earphone unit will be of the standard hearing-aid type.

3.5.3. If possible, the directional antenna shall be built into the receiver unit. Otherwise, the antenna shall be external to the receiver case and concealable on the operator.

4. EQUIPMENT OPERATION AND MAINTENANCE CHARACTERISTICS

4.1. DUTY CYCLE AND WARM-UP

4.1.1. Duty Cycle

The equipment shall be capable of continuous operation for 6 to 8 hours on one set of batteries.

4.1.2. Warm-Up

The maximum allowable time for warm-up shall not exceed 30 seconds.

4.2. DEGREE OF COMPLEXITY OF OPERATION

The operation of this equipment shall be no more complex than the tuning of a simple short-wave receiver.

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4.3. MAINTENANCE AND REPAIR

4.3.1. Alignment and Calibration

The units should be aligned and calibrated prior to issuance so as to safeguard against shipping damage.

4.3.2. Preventive Maintenance

No preventive maintenance program is planned for this equipment. Normal precautionary measures, such as removing batteries prior to storage, etc., shall be necessary.

4.3.3. Periodic Overhaul

There will be no definite overhaul periods for this equipment.

4.3.4. Spare Parts Lists

Spare parts lists shall be supplied for both field and base station maintenance.

4.3.5. Personnel Safety Requirements

Special safety precautions shall not be necessary.

4.3.6. Test Equipment Required

For base station maintenance, standard radio test equipment will be required. For field station maintenance, no test equipment is required.

4.3.7. Operational and Maintenance Instructions

4.3.7.1. Name-Plate Instructions

All controls will be identified as to their function and direction of operation.

4.3.7.2. Instruction Manuals

Instruction manuals shall be supplied.

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5. COMPATIBILITY WITH EXISTING OR PLANNED EQUIPMENT

The equipment shall be compatible with existing or planned direction finding equipment operating within the frequency range of 2 mc. to 16 mc.

6. QUANTITY OF UNITS TO BE PRODUCED

7. AVAILABILITY FOR OVERSEAS SHIPMENT

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